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September 25, 1996

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, D.C. 20554

Re: Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, CC Docket No. 92-297

Dear Mr. Caton:

On behalf of Sierra Digital Communications, Inc. ("Sierra"), I am filing the original and one copy of this letter to accompany the attached written ex parte communication pursuant to Section 1.1206(a)(1) of the Commission's Rules.

Kindly date-stamp and return the extra copy of this letter provided.

If there are any questions about this filing, please call me directly at the number above.

Respectfully submitted,

Mitchell Lazarus

Enclosure

cc (w/encl):
Chairman Reed E. Hundt
Commissioner James H. Quello
Commissioner Rachelle B. Chong
Commissioner Susan Ness
Blair Levin

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cc (w/encl): (continued)
Jackie Chorney
Rudolfo M. Baca
Suzanne Toller
David R. Siddall
Michele Farquhar
David Wye
Robert James

Hal Tenney, Sierra Digital Communications, Inc.

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1050 Connecticut Avenue, NW
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September 25, 1996

Ms. Jackie Chorney
Office of Chairman Reed E. Hundt
Federal Communications Commission
Room 814 - Stop 0101
1919 M Street NW
Washington DC 20554

Re: Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, CC Docket No. 92-297

Dear Ms. Chorney:

During our meeting in your office concerning the above-referenced docket, you asked why it is not feasible to relocate the point-to-point operations at 31 GHz to another microwave band. I am pleased to enclose a detailed response from Sierra Digital Communications, Inc. ("Sierra").

As Sierra's letter explains, the frequencies below 31 GHz suffer from several related problems -- particularly for traffic coordination and monitoring, which is the most widespread application of 31 GHz point-to-point services: These bands are highly congested, and so require a narrow beamwidth to achieve a high degree of frequency re-use; but the longer wavelengths at those frequencies need a larger antenna to achieve the narrow beamwidth, and the large antennas cannot fit into the housings required for the traffic environment. In addition, the technical rules for these bands make the equipment substantially more expensive.

Above 31 GHz, on the other hand, the first allocated band is at 38 GHz, which is heavily licensed in metropolitan areas throughout the United States. Sierra has determined that no capacity is available to accommodate 31 GHz users. All other capacity is above 40 GHz, where the technical considerations outlined in Sierra's letter increase the cost of equipment many times over.

The applications presently using 31 GHz chose that band, rather some other, because the unique combination of FCC technical and licensing rules, together with propagation characteristics and other technical properties, made the band

optimally suited to these particular applications. A move to any other band, even if otherwise feasible, would entail substantial added costs. More than 70% of 31 GHz transmitters are used by city, county, and state communications systems, hospitals, schools, and traffic control and monitoring systems. Unlike commercial service providers and many other microwave licensees, tax-supported users cannot recover costs by raising rates, or in any other way. For these entities, more than a nominal increase in costs would effectively foreclose the use of microwave communications.

Please do not hesitate to call me directly if you have any further questions.

Sincerely,

Mitchell Lazarus

Enclosure

cc (w/encl) (by Hand Delivery):
Office if the Secretary (2 copies)
Chairman Reed E. Hundt
Commissioner James H. Quello
Commissioner Rachelle B. Chong
Commissioner Susan Ness
Blair Levin
Rudolfo M. Baca
Suzanne Toller
David R. Siddall
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David Wye
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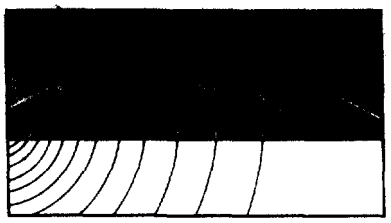
Counsel for CellularVision USA, Inc.
Douglas G. Lockie, Endgate Corporation
Douglas A. Gray, Hewlett-Packard Company
Counsel for Texas Instruments, Inc.
Hal Tenney, Sierra Digital Communications, Inc.



SIERRA DIGITAL
COMMUNICATIONS

September 21, 1996

Mr. Mitchell Lazarus
Arent Fox Kintner Plotkin & Kahn
1050 Connecticut Avenue, N.W.
Washington, D.C. 20036

Re: Rules and Policies for Local Multipoint Distribution Service
and for Fixed Satellite Services, CC Docket No. 92-297

Dear Mitchell:

The following is in response to a question you posed to Hal Tenney on September 12th:

Why are microwave bands other than 31 GHz unsuitable for the present type of point-to-point radio link operations?

INTRODUCTION

More than 70% of the existing 31 GHz radios that are now in use are being used in public service such as hospitals; schools; city, county, state, communications systems and traffic control systems. By and large, these public entities operate on budgets defined one to two years in advance of the release of funds. Certainly these users did not budget for the obsolescence of their equipment by an FCC rulemaking. Any frequency move or operating parameter change must take into account the limited capability these organizations have to adsorb unexpected costs.

The present 31 GHz band provides a unique set of parameters that are not easily duplicated at other frequencies. The ease of licensing, the narrow antenna beamwidth requirement and high path attenuation to prevent interference, the moderate stability requirement, and the lack of a spectrum efficiency requirement all add together to allow a minimal cost radio with good performance. There does not appear to be an alternate and equivalent operating band available

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LOWER FREQUENCIES

Below 19.7 GHz, the established technical requirements of: 38 dB gain antennas, one bit/Hz, and 0.003% frequency stability make equipment too costly. There is absolute no way to use any substantial part of the existing equipment to reduce the cost of moving to frequencies below 19.7 GHz. Even if the cost could be adsorbed, the size of a 38 dB gain parabolic antenna at 19 GHz is 21 inches in diameter. This would prevent the Equipment from fitting in presently utilized housings and therefore make them unsuitable for use in the traffic environment.

HIGHER FREQUENCIES

Above 31 GHz the only cost effective location would be the 38 GHz band. The FCC allocation for this band has been made on a geographical basis with blocks of frequencies assigned to various rectangular service areas. In metropolitan locations these service areas are controlled by several large service providers. ***There are no frequency pairs available for the present 31 GHz users.***

The increased costs associated with a move to above 40 GHz would increase the RF head cost from a list price of $4000 to a list price between $6000 and $7500. This does not include amortization of any of the engineering. The per head cost of converting the present units sent back from the field would be about $5000. To equip the lab would cost about $250,000. Engineering would be close to $200,000. Perhaps the most onerous part of changing frequencies is the time required to develop a new product. During the development of a new radio the present and pending users of 31 GHz will have no access to radios with similar cost and ease of licensing for expansion or implementation of new systems.

THE 23 GHz BAND

This leaves only the 23 GHz band as a place to move the present 31 GHz users. This band is already very crowded for the typical user but a traffic user has an even more difficult task. The antenna gain requirement at all but four frequency pairs in the middle of the band, is 38 dB. In many cases there are sidelobe requirements that dictate the use of antenna shrouds. This indicates the antennas would need to be at least 18 inches in diameter and would probably need a four to six inch shroud. Aside from the cost involved, an antenna this large would not fit in the accepted housing configuration and therefore would not be a desirable alternative in the traffic environment. This leaves the four frequency pairs in the middle of the band as the only place to operate for the traffic radio user since the relaxed side lobe requirements allow smaller antennas.

The regulations allow a beamwidth of four degrees with no sidelobe requirements. There is a front to back requirement of 38 dB and a frequency stability requirement of 0.05% . Also, a waiver is needed to operate more than five links in tandem. It is not likely that the typical 31 GHz traffic system of eight to ten links could get enough coordinated frequency pairs with which to operate.

The present 12 inch antennas at 31 GHz have beamwidths of 2.3^0 which allow closer pointing than does 4.0^0 or 3.0^0 which the present 12 inch antennas would have at 23 GHz. The traffic systems could exist with four 31 GHz frequency pairs with the 2.3^0 beamwidth but the wider beamwidths at 23 GHz would make operation marginal at best

APPENDIX - COST FACTORS

GENERAL

. An investigation was made of our present suppliers and we found that none of them had produced production quantities of 40 GHz versions of the components we presently purchase from them in the 31 GHz band, such as Gunn diode oscillators, and circulators. We also asked about items we presently manufacture such as Waveguide filters, antenna feeds and mixers. Most suppliers were reluctant to quote anything but budgetary prices for production quantities. We also looked into the cost of test equipment because none of Sierra's present equipment goes above 40 gHz. There is a Waveguide size change at 40 GHz along with other subtle mechanical changes. The Waveguide inside dimensions go from 0.280" x 0.140" (WR28) to 0.188" x 0.094" (WR19). Two pennies stacked are thicker than 0.094". This adds to the complexity and sensitivity of the assembly and alignment process.

TEST EQUIPMENT

The need for test equipment for development and production cannot be ignored. Above 18 GHz most designs are done in Waveguide. Test equipment for Waveguide comes in well-defined bands. The 31 GHz equipment is built using WR 28 which is used from 26.5 to 40 GHz. The next standard size is WR 22 (33 to 50 GHz) followed by WR 19 which goes from 40 to 60 GHz . Sierra has test equipment from 18 through 40 GHz. To design and produce equipment above 40 GHz would require the purchase of approximately $250,000 worth of equipment. This would include a Spectrum Analyzer, Frequency Counter, Power Meter Detectors, Couplers, Waveguide Scalar Bridge, Variable Attenuators, and a Frequency Sweeper. To go into production, everything would need to be duplicated except the Spectrum Analyzer. A number of Sierra's VARs have Frequency Counters to insure compliance with the FCC frequency requirements. They would face a cost of about $12,000 for new Frequency Counters.

ENGINEERING

If the same basic block diagram, with the same signal format and deviation, can be used (this is not a given.), the new designs needed will be: (1) a new Waveguide filter, (2) a new mixer, (3) a new antenna feed, (4) new circulators, and (5) new Gunn diode oscillators. It is estimated that the required engineering will take about six to eight months in elapsed time and about four man months of engineering with technician support. There would also be considerable outside service costs such as machining and Printed Circuit Board fabrication.

At present, Sierra builds a good portion of the Gunn diode oscillators now shipped in their radios. Building these oscillators is more of an art than a science. We also purchase oscillators from two vendors at a cost that is 50% greater than the internal manufacturing cost. Because absolute control over the diodes used is needed, Sierra would not attempt to design and build 40 GHz oscillators but would buy outside. The present vendors, both semiconductor manufacturers, were asked to quote Gunn diode oscillators above 40 GHz. Neither vendor had ever built production quantities of any Gunn diode oscillators above 40 GHz, but had built one's and two's for special purposes. The budgetary prices quoted were about three times Sierra's internal cost and about twice the outside cost. Neither vendor would quote firm prices and neither would offer the same frequency vs. temperature performance of the present units. The quoted units also needed more current for the same power output.

The circulators were quoted at three times the present 31 GHz price and were readily available. Where the present design uses only one circulator, the higher frequency radio would use two in order to assure a good match for the transmit Gunn diode oscillator.

The present antenna feed is a simple splash plate feed. At 31 GHz the splash plate is flat; and at 23 GHz the plate is concave. We expect the plate to be convex at 40 GHz which will require a formed or stamped part. After the stamping dies are made there will be only a small difference in the feed cost.

The 31 GHz mixer is a rat race type using silicon diodes. It is likely that a similar type can be used , however the diodes would need to be changed to GaAs. These diodes will increase the price of the mixer by about 50%.

The Waveguide filter now uses inductive posts to couple the cavities. This is an attractive way to construct a filter because holes can be machined with high accuracy, post material can be centerless ground to tight tolerances, and the post length is determined by the waveguide height. As the required center frequency is increased and the Waveguide becomes smaller, construction becomes a problem due to "wicking" around individual posts during fabrication. Filters at 40 GHz would need to be constructed using either iris or septum type cavity coupling and individual coupling adjustment would be necessary. This would double the cost of these filters.

If you have any questions or if you need additional technical justification for the topics discussed herein, please give me a call.

Sincerely,
Sierra Digital Communications, Inc.

Drew Lance, Chairman and CEO

cc: Hal Tenney